

ROMANZOFFIA THOMPSONII (HYDROPHYLLACEAE),
A NEW SPECIES FROM OREGON

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ABSTRACT

Romanzoffia thompsonii, a new species from Oregon is unique in the genus in its annual, bulbless habit, in having some lower leaves opposite, in always having some basal leaves entire and the distinct form of those that are lobed, and apparently in having throat spots or bands. This is also the smallest species of the genus in nearly every respect save seed size. Range and habitat, similarities to and differences from other members of this genus, and how this species modifies the concept of the genus are detailed.

With the addition of *Romanzoffia thompsonii*, the genus now consists of five species of temperate, western North America. All are fibrous-rooted, mesophytic herbs with helicoid inflorescences of \pm funnellform flowers arising from a basal rosette of long-petiolate, \pm ovate, orbicular or reniform, often lobed leaves; the single style is undivided or only minutely bilobed at the apex. The lobed, orbicular to reniform basal leaves of the perennials arise from bulbs or bulb-like developments; the annual is bulbless and some of its \pm ovate to orbicular basal leaves are always entire. Although none of these features is restricted to *Romanzoffia*, simple styles are absent elsewhere in the Hydrophyllaceae except for *Phacelia tetramera* J. Howell. The perennial species are an even more distinctive group; their bulbs are singular in the family. *Romanzoffia thompsonii*, although annual and bulbless, is otherwise similar to the perennials. Its greatest similarities are with *R. californica* E. Greene and *R. sitchensis* Bong., with which it shares a distinctive assortment of features.

From its first collection in 1899 to 1970 there were only six localities known for this species (South Peak, Cone Peak, Iron Mt., Lost Ck. Ranch, Spencer's Butte, and Abbott Butte). Reporting its existence at conferences on rare, threatened and endangered plants in Oregon in 1975–1977 resulted in its "rare" listing (Siddall, et al. 1979) and stimulated considerable field work and other published references (see Fitz 1979, Meinke 1982, Ross and Chambers 1988). By 1983 about 20 sites were known, most based on herbarium specimens. Since then, over 100 sites have been recorded, most based on BLM or US Forest Service Sighting Reports. Although many of these latter sites have been documented, and although both the distribution and habitat data from the Sighting Reports strongly parallel

that from the herbarium record, Sighting Report data is used here to augment understanding of this plant's habitat and for the two Coos County localities listed in the discussion of the distribution of *R. thompsonii*.

It is with great pleasure that I dedicate this new species of *Romanzoffia* to the late J. William Thompson, long a student and an assiduous collector of the Pacific Northwest flora, especially *Romanzoffia*. I have selected his collection, the first material I saw of this species, as the type.

Romanzoffia thompsonii Marttala, sp. nov. (Fig. 1).—TYPE: USA, Oregon, Douglas Co., Abbott Butte, alpine slopes, 6000', 2 Jul 1936, *J. W. Thompson 13069* (holotype, NY; isotypes, MO, ND-G, WTU).

In genere suo duratione annua, bulbis destitutis, foliis inferioribus nonnullis oppositis, foliis basalibus saepe integris (si lobatis tunc modo distincto), necnon omnium partium (praeter semina) magnitudine minima singularis.

Annual, \pm erect, gracile herb, (1.5–)2.5–10(–18) cm tall, growing singly or usually in loosely to densely aggregated mats or clumps (to ca. 50 cm across if dense); bulbless. Cotyledons usually persisting; petioles ca. 5 mm long; blade oblong-deltoid, 2–3 mm long. Leaves \pm succulent, ca. 0.5 mm thick, \pm glaucous (fresh), some of the lower leaves opposite, the upper usually alternate; petioles (3–)5–15(–25) mm long, the basal 2–5(–8) mm flattened, 0.5–1.5(–3.0) mm broad, but neither thickened (or only slightly so) nor persisting as a bulb scale, glandular-villous, especially basally; blades ovate to orbicular to obovate, entire to 3(–5)-lobed, 1–5(–10) mm long, 1–5(–9) mm broad, nearly glabrous to sparsely glandular-villous, at least the margins sparsely stipitate-glandular, base attenuate to truncate, sinus not evident in herbarium specimens but occasionally a small sinus is seen in living material whose bases are thus cordate, lobes often only small teeth, commonly unequal, triangular-ovate, broadest at or near the base of the lobe, rarely broadly ovate and broadest above the base of the lobe, 0–2(–4) mm long, apex (and that of the lobes) acute, obtuse to mucronulate; cauline leaves similar to the basal but reduced. Inflorescence ca. twice as long as or longer than the basal leaf rosette, axis often winged; terminal cyme 1, (1–)2–3(–5)-flowered; lateral cymes 1–3, each 1–2(–5)-flowered; each cyme with 1(–2) cymules of 1–2 flowers; flowering pedicels (2–)4–6(–10) mm long, fruiting pedicels (5–)7–15(–25) mm long, thus inflorescences open (see Table 1, Habit Syndromes), axis and pedicels minutely stipitate-glandular; propagules absent. Calyx lobes lanceolate to triangular, acute or obtuse to mucronulate, (1.0–)1.5–2.5(–3.0) mm long, (0.3–)0.4–0.6(–0.7) mm broad, almost gla-

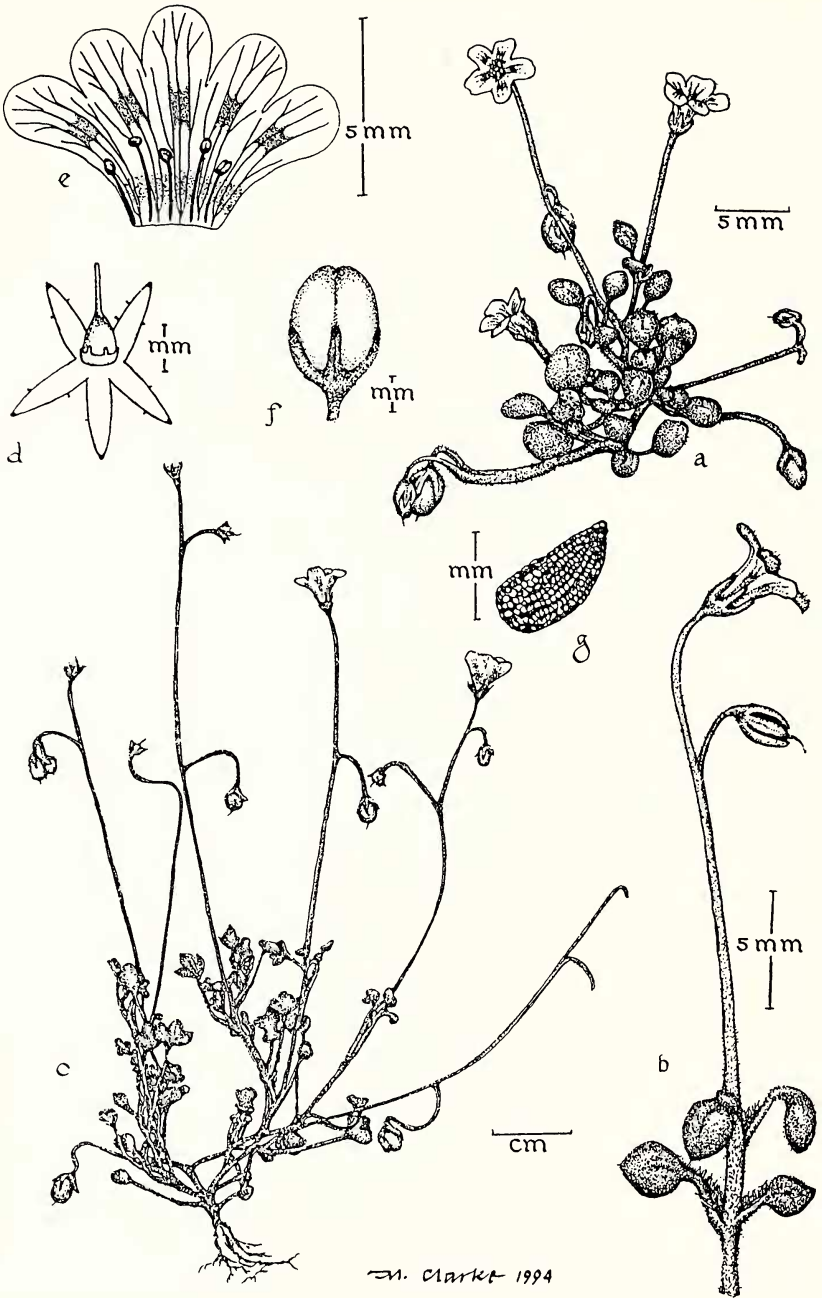


FIG. 1. *Romanzoffia thompsonii*: a-c, habit; d, calyx and gynoecium; e, corolla interior and stamens; f, capsule; g, seed. (a, b from photos; c, d, f, g from specimens;

TABLE 1. COMPARISON OF THE SPECIES OF ROMANZOFFIA.

>>>>>>>Bulbous perennials; only the cotyledons opposite; basal leaf blades reniform to orbicular with cordate to truncate bases, some always sinusate (sinus ~ 3/10 of blade length), some always >1 cm broad, rarely with fewer than 5 lobes; corollas mostly 5–10 mm long, without throat spots; seeds >15 per capsule, averaging 1.0–1.3 mm long		
	Habit Syndrome #1	Habit Syndrome #2
	Slender, ± glabrous, glandular-villous, lax to sublux plants (inflorescences ≥2 × to 1.5–1 × basal rosette) with open inflorescences (flowering pedicels ≥2 × calyx length); calyx lobes 0.5–1.4 mm wide; styles longer; rarely coastal	± Stout, viscid-villous, very rarely glandular, condensed to sublux plants (inflorescences ~ to 1.5–2 × basal rosette) with compact inflorescences (flowering pedicels ~ calyx) calyx lobes 1.0–2.1 mm wide; styles shorter; coastal
Bulb Feature Syndromes		
Bulbs scaly; scales spirally arranged, evident, villous; styles glabrous, shorter than next; distribution more northern than next	1. <i>R. sitchensis</i> Plants lax to sublux Styles mostly >2 mm long AK to CA, ALTA, MT + ID	3. <i>R. unalaschensis</i> Plants condensed to sublux Styles mostly <2 mm long AK (+ Brit. Col.?)
Bulbs tuberlike; scales distichously arranged, obscured by woolly pubescence; style base usually villous	2. <i>R. californica</i> Plants lax Styles mostly >3 mm long OR + CA	4. <i>R. tracyi</i> Plants condensed (to sublux) Styles mostly <3 mm long Brit. Col. to CA
>>>>>>>Bulbless annual; some of lower leaves as well as cotyledons opposite; basal leaves ± ovate to orbicular with cuneate to attenuate bases, rarely sinusate (then sinus ~ 1/10 of blade length), <1 cm broad, mostly entire, to 3, rarely 5-lobed; corollas mostly ≤5.5 mm long, with throat spots; seeds ≤12 per capsule, averaging 1.7 mm long; OR		
		5. <i>R. thompsonii</i>

brous to sparsely glandular-villous. Corolla funnellform, (3.0–)4–5.5 (–7.0) mm long, limb eventually spreading, (2.5–)3.5–5(–6.5) mm broad, base of the corolla 1.0–1.5 mm wide, tube 1–2(–3) mm long, lobes oblong-deltoid to ovate, apex obtuse or truncate to rarely re-

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e from photos and specimens. a from *Marttala* 3097b, 3097a; b, e–g from *Marttala* 4515; c from *Holmes* 752; d from *Marttala* 3097. Note: a and b illustrate only the above ground parts of the plants seen in the photographs, but when the plant in b was in fruit, the root system was 2/5 of the plant's total length.)

tuse, 1–2 mm long, 1.0–1.5 mm broad; tube and lower throat with a gold band about 1 mm wide, the top of which approximates the top of the calyx; throat with five gold, rarely yellow spots \pm 0.5 mm across, overlapping the base of the corolla lobes, alternating with the sinuses, or rarely a gold band \pm 0.5 mm wide at the same height; these markings seldom evident in herbarium material. Stamens 1–2.5 mm long; filaments 1.0–2.1 mm long; anthers (0.3–)0.4–0.6 mm long, (0.2–)0.3–0.5 mm broad. Disk 0.1–0.3 mm tall, appendages subulate to deltoid, 0.1–0.2 mm high. Ovary at anthesis 0.5–1.1 mm tall, 0.4–0.7 mm broad, sparsely glandular to glabrous; style (0.4–)0.7–1.3(–1.8) mm long, glabrous or the basal 0.3 mm or less sparsely villous, stipitate-glandular or glandular-villous. Capsule oblong to elliptic, (2.0–)2.8–5.0(–6.0) mm long, (1.5–)1.8–3.0(–3.4) mm broad, (1.2–)1.3–1.9(–2.1), averaging 1.6 times as long as broad, sparsely glandular to glabrous. Seeds (1–)4–8(–12); (1.4–)1.5–2.0(–2.4), averaging 1.7 mm long, 0.6–1.0(–1.2), averaging 0.8 mm broad; dull brown when mature. Blooms from March to early August, depending on site and season.

PARATYPES. USA, Oregon, Marion Co.: rock outcrop along F.S. Rd. 4685 ca. 1.6 mi S of Rd. 46, *Marttala* 4528 (NY, OSC). Linn Co.: slopes above F.S. Rd. 1003–409, ca. 0.4 mi S of Beard Saddle, *Marttala & Poff* 4515 (NY, OSC, Reed C); slopes above F.S. Rd. 2067–560 ca. $\frac{1}{4}$ mi E of start of Trail 3380, *Marttala* 4482 (NY, OSC); Cone Peak, *Antos* 485 (OSC), *Marttala* 3443 (F, HPSU, MO, NY, Reed C, RSA, TEX, U, UC, US); Iron Mt., *Eggleston* 22164 (US); Browder Ridge, T14S R6E S5, *Antos* 481 (OSC). Lane Co.: cliffs along Hwy 126, 2.3 mi S of Linn Co. line, *Marttala* 3441b (MT, NY, OSC, UBC, US, UTC, WS); cliffs along Hwy 126, 2.4 mi S of Linn Co. line, *Marttala* 3460a (CAN, CAS, ID, ISC, NY, Reed C); slope above Hwy 126, T16S R4E S23, *Close EO* # 042 (Hb. WNF); Northwest primary base of Spencer's Butte, *Verl White s.n.*, 8 May 1935 (ORE); bluffs near Lost Ck. Ranch [S of Lowell], *Andrews* 413 (ORE); rock outcrop below Rd. # 140 [not 141], T 20S R3E S6, *Pavlet* 31w (Hb. WNF). Douglas Co.: "Dome Rock", T24S R3E S35, *Everett EO* # 039 (Hb. WNF); bald, T24S R1W S18, *Holmes* 795 (ORE); rock bluff above Rd. 3806, 0.8 mi E of Siwash Ck., *Fontaine, Godfrey & LaMarr, Acc.* # 4/R-6 SR # 593 (Hb. NURD: photocopy!); Medicine Ck. Rd. at Slide Ck., *Hopkins, Thiele, Fosback & Carlson* M174 (Hb. DCM/RO); F.S. Rd. 28 ca. $\frac{1}{4}$ mi S of junc. with Rd. 2801 at Copeland Ck. Bridge, *Marttala & Ford* 3359 (ALA, DAO, NY, S, UC, WTU); F.S. Rd. 28 ca. 0.5 mi S of junc. with Rd. 2801 at Copeland Ck. Bridge, *Marttala & Ford* 3357 + 3557a (B, G, GH, NY, OSC, P, Reed C, UC, US, WTU); Cougar Bluffs, *Joan Fosback s.n.*, 6 Jun 1979 (OSC); bald, T26S R2W S25, *Holmes* 1073 (Hb. BLM/RD); rock outcrop $\frac{1}{4}$ mi

SW of Clover Butte, *Tighe s.n.*, 29 Jul 1993 (Hb. NURD: photocopy!); bald, T27S R3W S25, *Holmes 752* (Hb. BLM/RD, ORE); near Rd. 6510, 0.6 mi S of Flat Ck. crossing, *Loftis & Scully s.n.*, 19 Jun 1990 (OSC); Abbott Butte [topotypes?], *Leiberg 4251* (ORE, US), *Marttala 3097* (F, GH, K, LE, NY, OSC, Reed C, UC), *Marttala 3097a* (F, GH), *Marttala 3097b* (K, LE, MO); Beatty Ck. rocks, Cow Ck. canyon, *Hopkins, Thiele, Fosback & Carlson M148* (Hb. DCM/RO); Irwin Rocks, *Joan & Ollie Fosback s.n.*, 10 Apr 1978 (NY, OSC, UC, WTU); meadow ca. 14 km SE of Remote, *Sundberg 843* (Hb. BLM/RD, OSC), below Rd 33.1, T30S R9W S33, *Rittenhouse 961* (Hb. BLM/CBD: photocopy!).

Romanzoffia thompsonii is confined to Marion, Linn, Lane, Douglas and Coos (?) Counties (Fig. 2). It occurs in the Cascade Mountains and western foothills, from the upper North Santiam River drainage, south to within 0.1 mi of the Jackson County border on Abbott Butte, in the upper Rogue River and South Umpqua River drainages, west to the Southern Coast Mountains of the Middle Fork of the Coquille River drainage southeast of Remote and near Irwin Rocks in the adjacent South Umpqua River drainage, reaching Coos County at "Kenyon Mt. near Remote" (Siddall, personal communication of a Sundberg 1980 Sighting) and possibly near Bridge (Bruce Rittenhouse, personal communication). *Romanzoffia sitchensis* occurs from Alaska south to northern California, but only occasionally in Oregon and California; *R. californica* extends north from the San Francisco Bay area to the Oregon Coast Mts. of Tillamook County and Cascade Mts. of northern Lane County. Except for Marion and Linn Counties, the range of *R. thompsonii* is contained within the zone of overlap between *R. californica* and *R. sitchensis*.

Romanzoffia thompsonii grows in seasonally wet, usually open, rocky, sunny habitats. The elevation varies from approximately 230–1830 m (ca. 750–6000 feet). These sites most commonly face south to southwest (very rarely north). About two hundred plant species are known to grow with *R. thompsonii*. The most common are mosses, especially *Bryum miniatum*, *Mimulus guttatus*, *M. alsinoides*, *Plectritis congesta*, *Delphinium menziesii*, *Saxifraga integrifolia*, *S. nuttallii*, *S. marshallii* or *S. occidentalis*, *Collinsia parviflora*, *Montia parvifolia*, *M. fontana*, *Romanzoffia californica*, *Achillea millefolium*, *Cystopteris fragilis*, *Eriophyllum lanatum*, *Gilia capitata*, *Microsteris gracilis*, *Lewisia triphylla*, *Pseudotsuga menziesii*, *Holodiscus discolor*, *Calocedrus decurrens*, *Acer macrophyllum*, *Arbutus menziesii* and *Quercus garryana*. *Romanzoffia thompsonii* and *R. californica* grow together at perhaps 20% of the known *R. thompsonii* sites, at elevations of ca. 290–1370 m (960–4600 feet); at these locations the two species often grow completely intermixed in the moister parts of the habitat favored by *R. thompsonii*. Herbarium

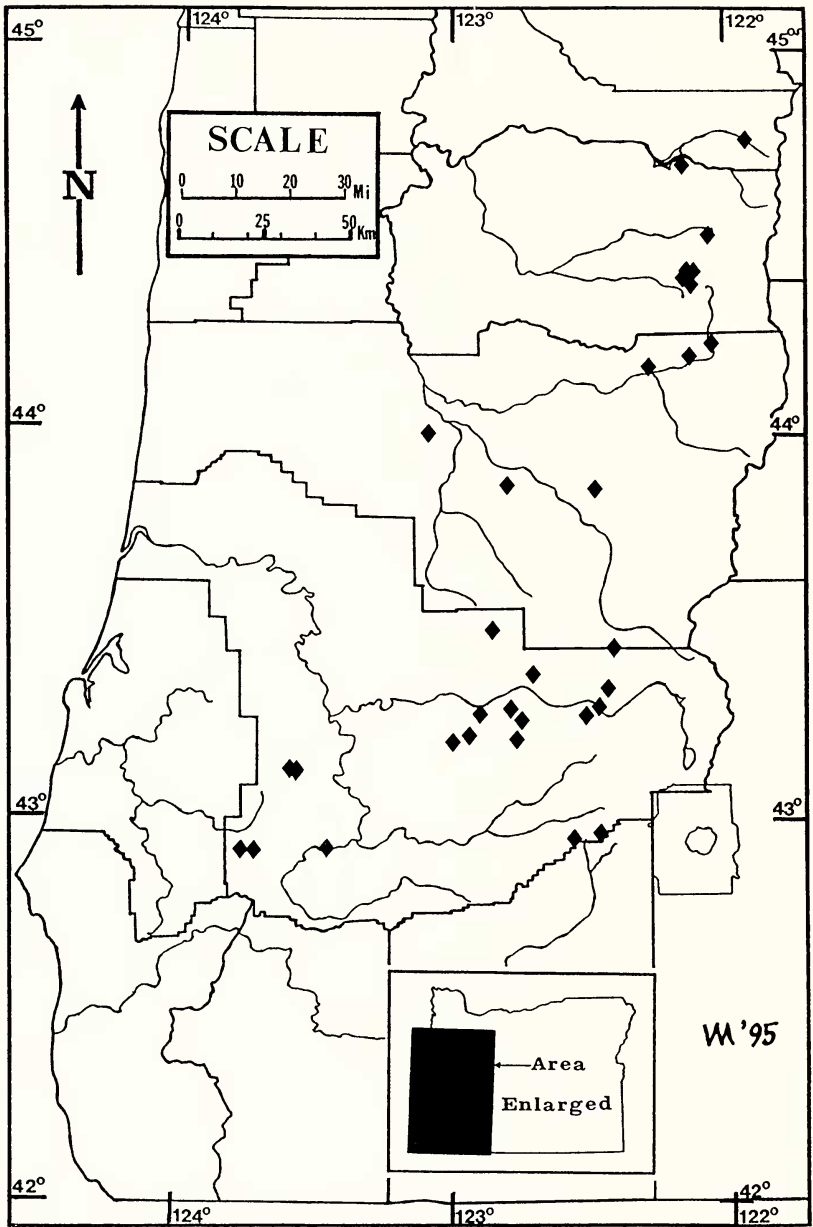


FIG. 2. Distribution of *Romanzoffia thompsonii* (solid diamonds) in western Oregon. Insert shows area enlarged.

label data and my own observations suggest that *R. thompsonii* requires saturated or inundated soil during the early part of its growing season. Later in the season these habitats experience a strong summer drought. These data suggest that this is a facultative, if not obligate, wetland plant. Site size and density vary considerably, from <10 plants in a site of a square meter to population systems estimated as tens of thousands of plants found over several acres. In larger populations the area in which *R. thompsonii* grows is often only a small part of the site in which it does occur, e.g., *Marttala 3441b* and *3460a*, Lane County sites of perhaps 50 and 75 m² on a cliff system about 0.8 km long.

Although now known from a large number of sites, the narrowness of its habitat, its annual habit and the small size of many of its populations warrant continued concern for the conservation of this species. The current status of *R. thompsonii* is Priority 1—'threatened or endangered throughout its range' (Oregon Natural Heritage Plan 1993). Probably the greatest threat to its survival are major habitat changes, e.g., erosion, loss of site water, succession converting the habitat into forest.

Table 1 and the description show that *Romanzoffia thompsonii* shares Habit Syndrome # 1 with calyx width and style length considered in proportion to flower size (see Table 2); in these respects it is unlike *R. unalaschensis* Cham. and *R. tracyi* Jepson, which share Habit Syndrome # 2. These data also show strong similarity between *R. thompsonii* and *R. sitchensis* f. *suksdorfii* (E. Greene) Brand (Brand 1913): calyx width, corolla size and style length in *R. thompsonii* approximate one half of the corresponding measurements in *R. sitchensis* f. *suksdorfii*; these taxa are also similar in corolla shape and capsule length/width ratio, but *R. sitchensis* f. *suksdorfii*, which occurs only in the Columbia River Gorge, has very different yellow eyes. In corolla shape, relative size of calyx and corolla (about twice as large as those of *R. thompsonii*), and yellow eye *R. californica* resembles *R. thompsonii*; but in longer styles and narrower capsules *R. californica* is dissimilar. While bulbless, *R. thompsonii* does share some bulb syndrome features with *R. californica*, i.e., a more southern distribution and the frequently, if inconsistently, pubescent style bases. The phase of *R. sitchensis* occurring closest to *R. thompsonii* is f. *greenei* Brand (Brand 1913, published this as f. *vulgaris*, following the American Code): it is found throughout western Oregon, but it is quite different from *R. thompsonii* in these features.

Among *Romanzoffia* the open, exposed habitats of *R. thompsonii* are most like those of the often sympatric *R. californica*. However, the habitats of *R. thompsonii* usually face \pm south (opposite the typical *R. californica* situation), and where they do grow together, *R. thompsonii* only occurs in the wetter part of their common habitat

TABLE 2. COMPARISON OF *ROMANZOFFIA THOMPSONI*, *R. SITCHENSIS*, and *R. CALIFORNICA*. Values given include 86–95% of measurements made.

Character	Taxon			
	<i>R. thompsonii</i>	<i>R. californica</i>	<i>R. sitchensis</i> f. <i>greenii</i>	<i>R. sitchensis</i> f. <i>suksdorfii</i>
Corolla Shape	long funnelform	long funnelform	broadly funnel- form/± rotate	long funnelform
Corolla Length	4–5.5 mm	7–10 mm	5–8 mm	7–10 mm
Style Length	0.7–1.3 mm	3.5–6 mm	2.3–5 mm	2–3.1 mm
Style Base Pubescence	present—but incon- sistently—in nearly half of populations	present, except in- consistently so in nearly half of populations near San Francisco	absent	absent
Capsule Length/Width Ratio	1.4–1.8	1.7–2.1	1.2–1.4	1.4–1.75
Yellow Eye	gold band in upper tube and lower throat	gold band in upper tube and lower throat	gold band in lower throat	diffuse yellow band in throat

or where the water supply persists longer. Although Leiberg also collected *R. sitchensis* on Abbott Butte (4259, ORE!, US!), his field books (US!) indicate that it was collected at a locality different from that of *R. thompsonii*. The habitat of *R. sitchensis*, as well as the ecotype of *R. californica* that Greene (1902) called *R. spergulina*, is generally more mesic, moister, and more protected (often by shade) than that of *R. thompsonii* or *R. californica*. *Romanzoffia thompsonii* is often sympatric with *R. californica* but apparently not with *R. sitchensis*, and there is no evidence of hybridization between *R. thompsonii* and either of these two species.

Overall, *Romanzoffia thompsonii* is most similar to *R. sitchensis* f. *suksdorfii* in morphology, but in habitat best fits *R. californica*, with which it is morphologically still quite similar. The habitat similarity, however, may only be a reflection of the preadaptation of *R. thompsonii* to a similar habitat.

Romanzoffia corollas have a "yellow eye"—a yellow or gold band, in the tube or throat (cf. Table 2). In addition to the yellow eye *R. thompsonii* corollas also (apparently) have five gold spots overlapping the base of the lobes, alternating with the sinuses, or a gold band at the same height, which I am calling throat spots or bands. This particular pattern—both throat markings and a yellow eye present—is rarely evident in preserved material, has not been noted by earlier collectors or observers (Fitz 1979, notes the throat spots and calls them a yellow eye, but does not mention the lower gold band; collectors note the presence of the yellow eye occasionally), and it is often not apparent in even fairly good photographs. It is evident in all thirteen of the *R. thompsonii* populations for which there is definitive photographic evidence and in the one population from which living material was available. I believe this particular pattern is a species characteristic and urge all who encounter this plant to examine the corollas for it.

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